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a light source configured to irradiate a fleshy medium with radiation at a plurality of wavelengths, each wavelength selected for attenuation sensitivity to at least one of a plurality of blood constituent concentrations, said plurality of blood constituent concentrations including a glucose concentration;

an active pulse inducement device which causes a periodic change in a volume of blood in the fleshy medium;

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an optical detector positioned to detect light which has propagated through said fleshy medium, said optical detector configured to generate an output signal indicative of the intensity of said radiation after attenuation through said fleshy medium; and

a signal processor responsive to said output signal to analyze said output signal to extract portions of said signal due to optical characteristics of said blood to determine the concentration of at least one selected constituent within said subject's bloodstream.

Please add the following new claims:

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12. (New) The system of Claim 1, wherein the active pulse inducement device causes a periodic change in the volume of blood in the fleshy medium independent of the natural flow of blood in said fleshy medium.

13. (New) The system of Claim 1, wherein the active pulse inducement device causes a periodic change in the volume of blood in the fleshy medium in conjunction with the natural flow of blood in said fleshy medium.

14. (New) The system of Claim 1, further comprising a receptacle which receives said fleshy medium, said receptacle further having an inflatable bladder.

15. (New) The system of Claim 1, further comprising a receptacle which receives said fleshy medium, said receptacle further comprising a temperature variation element, said temperature variation element cyclicly varying the temperature of said fleshy medium in order to induce a change in the flow of blood in said fleshy medium.